Brief Report

Conversation about the future self improves preschoolers' prospection abilities

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Abstract

Prospection, the ability to engage in future-oriented thinking and decision making, begins to develop during the preschool years yet remains far from adult-like. One specific challenge for children of this age is with regard to thinking and reasoning about their future selves. Drawing from work indicating the importance of adult–child conversation in language and cognitive development, the current study examined the extent to which conversations about the future and the self may facilitate preschool-aged children's prospective thinking. The participants, 4- and 5-year-old children (N = 68), were randomly assigned to read books surrounding one of four topics with an adult experimenter: their present self, their future self, another child's present self, or another child's future self. Children whose conversations were centered on their future selves outperformed other children in the sample on a battery of prospection assessments taken immediately after the manipulation. Of the three prospection assessments administered, the manipulation had the strongest effect on children's prospective memories. Results are discussed in terms of the role that everyday conversation can play in fostering children's cognitive development during the early childhood years.

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Introduction

As adults, much of our daily thinking and decision making concerns our future selves. For example, we write lists before grocery shopping, save money for retirement, and diet and exercise to remain healthy into the future. Decision making in these highlighted examples involves projecting ourselves forward in time to preexperience the event in question. This cognitive ability has been termed episodic future thinking (Atance & O’Neill, 2001) or prospection (Tulving, 1984, 2001) and is thought to be uniquely human and, importantly, related to planning, self-control, and goal attainment. The origins of prospection can be traced to early childhood when clear developmental improvements are evident between 3 and 5 years of age (e.g., Atance, 2015; Atance & Meltzoff, 2005; Busby & Suddendorf, 2005).

Prospection is considered to be a multifaceted construct that consists of several component processes tapping the ability to plan, make decisions, and delay gratification on behalf of one’s future self. Between 3 and 5 years of age, children show marked improvements in these processes such as inferring future goals (e.g., Suddendorf & Busby, 2005; Suddendorf, Nielsen, & Von Gehlen, 2011), predicting future preferences (Bélanger, Atance, Varghese, Nguyen, & Vendetti, 2014; Mischel, Shoda, & Rodriguez, 1989; Moore, Barresi, & Thompson, 1998; Russell, Alexis, & Clayton, 2010), and remembering to perform future actions (Guajardo & Best, 2000; Kliegl & Jäger, 2007). There is an interest in the field regarding the extent to which these component processes form one coherent factor versus several independent factors (e.g., Atance & Jackson, 2009; Chernyak, Leech, & Rowe, 2017). Of note, research has not found consistent links between these component processes and language, raising the possibility that prospection, or at the least some of its components, may be a construct independent of linguistic ability (e.g., Atance & O’Neill, 2005).

Yet despite age-related improvements, children’s ability to engage in prospection is far from adult-like. Given that reasoning about one’s own future is a core cognitive achievement and predictive of positive outcomes such as planning and goal attainment, understanding what experiences may help children to more successfully reason about their own futures is of crucial importance. We propose that engaging in conversations that include references to children’s future selves may be one such experience that facilitates the development of prospection. Observational data show that parents reference events in the future during everyday conversations (Benson, 1994; Lucariello & Nelson, 1987) and that this experience is positively correlated with children’s own future-oriented language (Hayne, Gross, McNamee, Fitzgibbon, & Tustin, 2011; Hudson, 2002, 2006; Nelson, 1989; Sachs, 1983). Importantly, however, these studies did not collect behavioral measures of prospection but rather relied on children’s verbal production of future language as the outcome measure of interest.

There is also experimental evidence to suggest that children’s future-oriented talk and thinking increases when adults use more future talk themselves. For example, Leech, Wei, Harring, and Rowe (2018) found that training parents to increase their future talk during home mealtimes caused corresponding increases in 4-year-olds’ future-oriented language. Furthermore, Chernyak et al. (2017) found that brief conversations between experimenters and 3- to 5-year-olds about events in their near futures (defined as 24 h into the future) caused significant improvements to children’s prospection-related behaviors such as future-oriented decision making and prospective memory. However, questions remain regarding the nature of such conversational experiences. In particular, we are interested in whether future-oriented conversations involving the self or another person may confer larger benefits to prospection. Neither Chernyak et al. (2017) nor Leech et al. (2018) explicitly contrasted the effects of talk about the self with those of talk about others in their experimental manipulations.

One possibility is that the exposure to future-oriented language alone will support children’s prospection abilities. We call this the future-oriented hypothesis. Support for this hypothesis comes from work by Hudson (2002, 2006), which shows that adults’ talk about the future improves children’s ability to talk about the future—yet does not specify the types of input content that might be most helpful in supporting these developing skills. A second explanation is the self-relevant hypothesis, which states that thinking about oneself—regardless of the temporal frame (present or future)—will improve children’s prospection abilities. For instance, Chernyak et al. (2017) found that children used more self-projecting language (e.g., personal pronouns) when asked to mentally represent themselves in the future or past. This pattern raises the possibility that children who are asked to talk about their
future or present selves will show better prospection outcomes compared with children who talk about other children’s present or future; it may be that the important conversational content is not future references per se but rather references to the self.

A third possibility is that a combination of future-oriented and self-projecting conversations will result in the largest improvements to prospection abilities (termed the extended self hypothesis). This hypothesis is at the core of many approaches of prospection, defined as envisioning one’s own future rather than someone else’s (e.g., Moore, Lemmon, & Skene, 2001; Suddendorf & Corballis, 1997; Tulving, 1984, 2001). This hypothesis would lead to the prediction that future-oriented conversations about the self are most beneficial to fostering prospection compared with present-oriented conversations or future-oriented conversations about another person. On prospection tasks that induce conflict between current and future preferences, 3- to 5-year-old children more successfully predict future preferences and make more accurate future-oriented decisions for other children than for themselves (Bélanger et al., 2014; Lee & Atance, 2016; Russell et al., 2010). These data suggest that children find prospecting about their own future particularly challenging and may need additional scaffolding, such as conversation, in order to master future-oriented thinking about themselves.

Regarding the development of children’s prospection, Chernyak et al. (2017) found that prospection abilities were the strongest immediately after children discussed events in the near past or near future, two situations that are temporally relevant to children. In line with the extended self hypothesis, this work raises the possibility that temporally relevant conversations may encourage self-projection and, thus, be a particularly important experience in fostering prospection. Yet because participants in this study discussed only their own future and not someone else’s, the direct effect of self-projection on prospection is not fully clear. In fact, we are unaware of any work that has specifically manipulated the concept of self-projection in relation to prospection and future-oriented conversation.

Thus, the central goal of this study was to introduce an experimental paradigm that directly manipulates the extent to which preschool-aged children must self-project while engaging in future-oriented versus present-oriented conversation with an experimenter and determine whether this manipulation affects subsequent performance on a battery of prospection tasks. We focused on 4- and 5-year-olds because previous research indicates rapid development of future-oriented thinking during this period. We employed a 2 \times 2 design to assess the individual and combined effects of the two factors (temporal distance and projection), resulting in four conditions: Future Self, Future Other, Present Self, and Present Other. During the session, the experimenter varied the extent to which she used future-oriented and self-projecting language in a systematic way. In the temporal distance manipulation, she altered the book language such that some children heard future-oriented language, whereas other children’s stories included present-oriented language that encouraged present-oriented thinking. In the projection manipulation, she varied whether the focus of the stories was on the target child or a similarly aged and gender-matched child character. The manipulation took place during a brief shared book-reading session between the child and an experimenter, a highly familiar context to children.

Method

Participants

This experiment was part of a larger study on future thinking and reciprocal sharing behaviors in children aged 3–5 years. We sought to recruit 80 children in line with sample size conventions of \( n = 20 \) per condition. We tested every child who received parental consent to participate, resulting in a sample of 83 children (52 girls and 31 boys). The sample was recruited from six preschool centers serving primarily middle-class families in a large city. For the purposes of the current experiment, we focused on 4- and 5-year-olds (\( n = 38 \) and \( n = 30 \), respectively, for a total of \( N = 68 \) children). All children spoke English and, per parent report, 46% of children (\( n = 31 \)) were exposed to another language in addition to English at home.
Materials and procedure

All children were tested in a separate quiet room in their preschool center. One experimenter conducted the book-reading intervention, and a separate experimenter, blind to condition assignment, performed the prospection assessment battery. Children's responses to the prospection assessments were live coded by a second experimenter and audio-recorded for a later reliability check by an independent, condition-blind research assistant.

Book-reading manipulation

The experiment represented four cells of a $2 \times 2$ design with two between-participant comparisons. The first factor, temporal distance, contrasted future versus present language. The second factor, projection, contrasted whether the conversation focused on the target child (self) or a same-aged and gender-matched child (other). Children were randomly assigned to one of the four conditions and read two stories adapted from a popular book series (Froggy by Jonathan London). Both 5-min stories contained engaging pictures and developmentally appropriate story plots. Stories were always read in a fixed order; a story about going to a doctor's office was read first, followed by a story about baking a birthday cake. To simulate a typical book-reading interaction, the experimenter asked children three scripted questions unique to each condition. The critical condition difference was in the text (Table 1 and summarized below).

Future Self condition ($n = 16$). In the Future Self condition, children were read stories in which they were the main character, performing actions that were expressed in the future tense with personal pronouns. To ensure that each child viewed himself or herself as the main character in the story, a Polaroid photo of the child was taken prior to the testing session. The child's photo was attached to each page on a predefined space, and the experimenter moved the picture to the next page as she read the story.

Present Self condition ($n = 17$). The stimuli used in the Present Self condition were created by transforming the language used in the future self books to the present tense. The same procedure involving each child's photo was used in this condition. Questions were modified such that they encouraged children to think about themselves in the present context.

Future Other condition ($n = 21$). In an attempt to keep the procedures as identical as possible to the Self conditions, the experimenter also took a photo of each child assigned to the Other conditions but did not use it in the story. Instead, the experimenter produced a photo of a gender- and age-matched child unknown to the target child, Lee or Sam, which was placed on the same predefined space as the Self conditions. The language in the stories was written in the future tense, and third-person, gender-appropriate pronouns were used throughout when referencing the main character. The comprehension questions focused on what the main character would do in the future.

Present Other condition ($n = 14$). The Present Other condition was adapted by modifying the text in the Future Other condition to the present tense. The experimenter introduced a photo of a gender- and age-matched child as the main character of the story in a manner identical to the Future Other condition. Comprehension questions concerned the present actions of the main character.

Prospection battery

Following the intervention phase, a second experimenter administered three prospection assessments lasting approximately 10 min. Prior research indicates that, on average, children of this age range understand the task requirements of these assessments, but there is still considerable variation in their performance. We chose these three measures because we reasoned that children would have little to no experience with the particular tasks and, thus, would need to engage in self-projection rather than activate script-based schemas to succeed (e.g., Atance & O'Neill, 2005).
Table 1
Stimuli design across the four conditions.

<table>
<thead>
<tr>
<th></th>
<th>Future Self</th>
<th>Future Other</th>
<th>Present Self</th>
<th>Present Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average number of pages</td>
<td>13</td>
<td>13</td>
<td>13</td>
<td>13</td>
</tr>
<tr>
<td>Temporal manipulation</td>
<td>Future</td>
<td>Future</td>
<td>Present</td>
<td>Present</td>
</tr>
<tr>
<td>Projection manipulation</td>
<td>Target child</td>
<td>Gender- and age-matched child</td>
<td>Target child</td>
<td>Gender- and age-matched child</td>
</tr>
<tr>
<td>Example text</td>
<td>The next morning, you wake up. “I will go to the doctor soon. But wait! What if the doctor will give me a shot?”</td>
<td>The next morning, Lee wakes up. He/she thinks about how he/she will go to the doctor soon. “But wait! What if the doctor will give me a shot?”</td>
<td>Here you are waking up in the morning. You sit up in your bed and look at the bright sun shining outside your window.</td>
<td>Here is Lee waking up in the morning. Lee sits up in his/her bed and looks at the bright sun shining outside his/her window.</td>
</tr>
</tbody>
</table>
| Example scripted question | What else will you do before you go to the doctor? | What else will Lee do before he/she goes to the doctor? | What are you doing right now in this picture? | What is Lee doing right now in this picture?
Prospective memory. In this task adapted from Guajardo and Best (2000), the experimenter revealed a small white box at the beginning of the assessment phase and told children, “I have a gift here for you in this box. When I say we are all done playing these games, you have to remind me to open it.” Children then completed the remainder of the assessment battery. At the end of the session, the experimenter stated, “Okay, we’re all done playing our games!” The experimenter waited 5 s for children to cue the experimenter to open the gift box. If children did not remind the experimenter within the given time frame, the experimenter then stated, “Do you have something to remind me about?” Children received a score of 2 if they reminded the experimenter to open the box without a reminder cue, a score of 1 if they remembered only after the experimenter reminded them, and a score of 0 if they did not remember.

Future-oriented decision making. Stimuli for this task included four items taken from Atance and Meltzoff (2005) mental time travel task. Children were presented with a color photograph depicting a scene (dirt road, playground, restaurant, or minivan vehicle), and the experimenter asked them to imagine that they were planning to engage in an activity related to each picture (e.g., walk, play, eat dinner with their family, or drive with their family, respectively). The experimenter then revealed three items (e.g., water bottle, present, and plant for the dirt road) and asked, “Which one of these items do you need to bring with you?” Children were given 1 point if they selected the correct item. We also probed children’s reasoning for their choice by asking, “Why do you need to bring _____ with you?” Each explanation was coded as correct if it was on-topic and conveyed a possible future scenario (e.g., “I’m bringing water because I might get thirsty”) (Atance & Meltzoff, 2005). We summed the forced-choice and explanation scores, such that children’s total score ranged from 0 to 8, which revealed good reliability (Cronbach’s α = .73). A second condition-blind researcher double coded the explanations, and percentage agreement ranged between 87.9% and 97.5%.

Delay of gratification. The ability to delay gratification has been argued to relate to future thinking over and above age-related improvements (Atance, 2015). For instance, preschool-aged children who delay gratification on Mischel’s marshmallow paradigm are rated by parents as better able to plan for future actions (Mischel, Shoda, & Peake, 1988). We used this evidence to motivate the hypothesis that future-oriented conversation may enable children to see that delaying immediate gratification will yield a larger future reward. Children were presented with a choice of receiving one sticker now or two stickers at the end of the game period (Thompson, Barresi, & Moore, 1997). If children chose one sticker, they placed it on a piece of paper provided by the experimenter. If children delayed gratification, the experimenter placed both stickers in an envelope that was given to children after the assessment period. The experimenter administered six trials. Participants received a score of 1 for each trial in which they delayed their gratification, resulting in total scores ranging from 0 to 6.

Task presentation order

The prospective memory instructions were always given at the start of the assessment. In between the memory instructions and the cue to open the box, children were tested on future-oriented decision making and delay of gratification, the order of which was counterbalanced across participants.

Results

Descriptive analyses of the individual prospection measures are presented in Table 2. Preliminary analyses revealed a significant positive correlation between prospective memory and mental time travel, r(68) = .27, p = .02, and a marginally significant correlation between prospective memory and delay of gratification, r(68) = .21, p = .08. Delay of gratification and mental time travel performance were positively correlated, but the association did not reach statistical significance, r(68) = .15, p = .22.1 After controlling for the effect of age, correlations between measures became nonsignificant (all rs > .10).

1 Note that because the measures were taken after the condition manipulation, the correlation coefficients might not be comparable to those of other studies without this manipulation.
We then examined potential differences on each of the prospection measures as a function of demographic factors (gender, age, and bilingual status) to determine which, if any, covariates to include in the primary analyses. As expected, performance on all three prospection measures significantly increased with age (in months) (delay of gratification: \( r = .25, p = .04 \); prospective memory: \( r = .23, p = .05 \); decision making: \( r = .26, p = .03 \)). There were marginally significant trends that monolingual children (\( M = 3.11, SD = 2.16 \)) outperformed bilingual children (\( M = 2.23, SD = 2.09 \)) on delay of gratification, \( t(66) = 1.70, p = .09, 95\% \text{ CI} [0.15, 1.92] \). The same marginally significant pattern was observed for prospective memory, \( t(66) = 1.77, p = .08, 95\% \text{ CI} [0.42, 0.71] \). Note that future-oriented decision making, the only task requiring verbal language production, did not significantly differ between monolingual and bilingual children, \( t(66) = 1.29, p = .20, 95\% \text{ CI} [-0.32, 1.50] \). No differences in performance were observed between boys and girls (all \( p s > .40 \)).

To address our primary question regarding the role of future-oriented language and self-projection in the development of children’s prospective abilities, we conducted a multivariate analysis of variance (MANOVA) predicting prospective memory, future-oriented decision making, and delay of gratification from condition as a fixed predictor. Age (in months) and bilingualism were added as covariates because of significant or marginal relations to dependent measures. Results indicated a positive effect of age, \( F(3, 60) = 3.76, p = .01, \eta^2_p = .16 \), and a negative effect of bilingualism, \( F(3, 60) = 3.20, \eta^2_p = .16 \).

Table 2
Performance in terms of means (and standard deviations) on three prospection measures for total sample and by age.

<table>
<thead>
<tr>
<th></th>
<th>Possible range</th>
<th>Total sample ( (N = 68) )</th>
<th>4-year-olds ( (n = 38) )</th>
<th>5-year-olds ( (n = 30) )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mental time travel</td>
<td>0–8</td>
<td>5.02 (1.88)</td>
<td>4.71 (1.86)</td>
<td>5.43 (1.85)</td>
</tr>
<tr>
<td>Prospective memory</td>
<td>0–2</td>
<td>0.79 (0.78)</td>
<td>0.71 (0.83)</td>
<td>0.90 (0.71)</td>
</tr>
<tr>
<td>Delay of gratification</td>
<td>0–6</td>
<td>2.71 (2.16)</td>
<td>2.45 (2.19)</td>
<td>3.03 (2.11)</td>
</tr>
</tbody>
</table>

Fig. 1. Effect of the condition manipulation on children’s prospection performance. Only children’s prospective memory was significantly influenced by language involving the future and self. Error bars represent standard errors.
Importantly, a main effect of condition also emerged (Wilks’s lambda), $F(9, 146.18) = 1.98$, $p = .04$, $\eta^2_p = .09$ (Fig. 1). To determine whether we were adequately powered to detect this condition effect, we conducted a post hoc power analysis. For this model, we had 85.3% power to detect an effect size of .09 with a sample size of 68.

A one-way ANOVA as a follow-up to the omnibus test indicated that the main effect of condition was driven primarily by prospective memory, $F(3, 62) = 6.48$, $p = .007$, $\eta^2_p = .18$. As such, we tested our three a priori hypotheses only on prospective memory. Specifically, the future-oriented hypothesis contrasted the Future Self and Future Other conditions with the two Present conditions, the self-oriented hypothesis contrasted the Future Self and Present Self conditions with the two Other conditions, and finally the extended self hypothesis contrasted the Future Self condition with the remaining three conditions. Given that the multiple comparisons were nonorthogonal, we tested against a more conservative probability level ($p < .01$).

Results did not support the future-oriented hypothesis given that there was no difference in prospective memory between the two Future conditions and two Self conditions, $F(3, 60) = 0.56$, $p = .65$, $\eta^2_p = .03$ (estimate = $-0.33$, 99% CI $[-0.60, 1.26]$). Similarly, there was no support for the self-oriented hypothesis; although children who were read stories about themselves—either their present selves or future selves—performed better than children in the other two conditions (estimate = $0.85$, 99% CI $[-0.07, 1.76]$), this contrast was only marginally significant after the probability correction, $F(1, 77) = 3.48$, $p = .02$, $\eta^2_p = .15$. Importantly, a significant effect was observed when testing the extended self hypothesis even after the probability correction. The planned contrast corresponding to this hypothesis revealed that children who were read stories about their future selves outperformed those in the other three conditions (estimate = $-2.01$, 99% CI $[-3.65, -0.37]$), $F(3, 60) = 4.24$, $p = .009$, $\eta^2_p = .18$. Thus, it appears that a combination of future-oriented and self-projecting language results in the largest boosts to prospective memory.

Given extant questions around age-related changes to prospection, we conducted an exploratory follow-up analysis to determine whether the extended-self hypothesis on prospective memory holds across both 4- and 5-year-old children. We ran a two-way ANOVA with age and condition as predictors of prospective memory while controlling for bilingual status. Of interest was the interaction term between age and condition, which was not significant, $F(3, 74) = 1.00$, $p = .39$, $\eta^2_p = .08$. Thus, although prospection abilities, particularly prospective memory, increases with age, encouraging children to think and talk about one’s future self was equally successful in increasing prospection for younger and older children in this sample of 4- and 5-year-olds.

Discussion

In this study, we explored the role that future-oriented language and self-projection play in promoting prospection during the early childhood period. We considered three hypotheses regarding how these two constructs may relate to prospection: (a) that future-oriented language overrides the effect of self-projection (future-oriented hypothesis), (b) that self-projection overrides future language (self-projection hypothesis), and (c) that a combination of future-oriented language and self-projecting language may confer the largest benefits to prospection (extended self hypothesis). The data supported the third hypothesis, indicating that brief exposure to future-oriented input about the self is the most beneficial for performance on measures of future-oriented decision making, delay of gratification, and (particularly) prospective memory.

This study adds to observational work showing that adults’ future-oriented talk correlates with children’s own talk about the future (Benson, 1994; Hudson, 2002, 2006) as well as experimental work highlighting the developmental mechanisms by which prospection develops during the early childhood period (Atance & Meltzoff, 2005; Atance, 2015; Busby & Suddendorf, 2005). We argue that a particular strength of this design is that future-oriented conversations were embedded into everyday routines, which builds on previous work that measured conversations that followed scripted questions from experimenters (e.g., Chernyak et al., 2017). Furthermore, to our knowledge, this is the first study to simultaneously manipulate two constructs known to be helpful in the development of prospection: future-oriented language and self-projection.
Our findings are in line with Chernyak et al.’s work, which found that encouraging children to talk and think about themselves in the near future also increased prospective memory. A conclusion from Chernyak and colleagues’ data was that discussing temporally displaced events such as those that will happen in the near future elicits self-projection, yet this hypothesis was not empirically tested because the design did not include a comparison condition in which participants prospected about another child’s future. Here we added empirical evidence in support of the self-projection hypothesis given the performance differences between the Future Self and Future Other conditions. We further suggest that self-related thinking is beneficial only when it is grounded in a temporally displaced context rather than the present given performance differences on prospective memory between the Future Self and Present Self conditions.

We find these results to be particularly important in light of several findings suggesting that preschool-aged children’s ability to think about their future selves is often more challenging than thinking about another child’s future (Bélanger et al., 2014; Lee & Atance, 2016; Russell et al., 2010). The current data, therefore, raise an interesting question in relation to these previous findings: Why in certain circumstances do children perform better when prospecting about another child’s future, whereas in other circumstances children demonstrate superior performance when prospecting about themselves? There are at least two possible explanations, the first of which involves differences in the measurement of prospection. Specifically, previous studies have used prospection measures that ask children to prospect into adulthood, which we did not predict to change as a function of conversation given that conversations about one’s distant future are less beneficial for prospection (Chernyak et al., 2017).

A second potential explanation is that the conversations during the book-reading interaction acted as a form of scaffolding to make the child’s future self more vivid. Because prospecting about the self is particularly challenging, we suggest that conversation, or another similar experience, may be a necessary scaffold to increase the vividness of a future experience (see Hershfield, John, & Reiff, 2018, for similar terminology). Support for this hypothesis comes from adult work showing that vividness interventions, such as asking an adult to write about one’s future (Rutchick, Slepian, Reyes, Pleskus, & Hershfield, 2018) or to participate in a virtual reality experience simulating one’s future (Van Gelder, Hershfield, & Nordgren, 2013), leads adults to make better future-oriented decisions. We argue that adult–child conversations may have served a similar purpose for increasing vividness in this study. Future studies that incorporate additional measures (e.g., those that assess children’s prospection about another child’s future) could offer evidence for whether this vividness hypothesis holds with young children as it does with adults.

Importantly, follow-up analyses revealed that the manipulation effect was strongest on prospective memory compared with future-oriented decision making and delay of gratification. We note that this result must be interpreted with caution given the small effect size of the omnibus test. We recognize that low statistical power may be an issue, so future studies with larger samples are needed in order to conclusively show that the other two measures were not similarly influenced by the manipulation. We nonetheless suggest that our results are particularly important given that prospective memory has been argued to be the construct most related to episodic future thinking because of the high reliance on self-projection to succeed (Atance & O’Neill, 2001).

We provide two possible explanations for why the manipulation may have favored children’s prospection memory. First, the vividness theory (e.g., Hershfield et al., 2018) would suggest that exposure to future self conversations may have helped children to encode the experimenter’s utterance more vividly, for example, by mentally representing the future experience of opening the box or retrieving the prize. This is particularly relevant to the prospective memory task because children likely never experienced a situation in which they were told to remind the experimenter to open a box after completing a set of games. It is also possible that the nature of the future language in the stories may have inadvertently affected prospective memory more than decision making and delay of gratification. For example, in both stories the main character experienced a situation when he or she needed to wait or remember to perform an action at a future time (e.g., remember to get the cake out of the oven in an hour). Because we included many varieties of future talk in the book stimuli (e.g., planning talk, hypotheticals), our study cannot speak empirically to this issue. We argue that
an interesting avenue for future research would be to manipulate the frequency with which children hear these different forms of future talk in an experimental context.

The results of this study raise a number of important questions for future research. First, the preliminary analyses suggest that monolingual children were marginally better on prospective memory and delay of gratification tasks, and this pattern of data clearly warrants further study. This is especially important in light of other developmental cognitive findings that often show opposite patterns, termed the bilingual advantage (e.g., Diaz & Farrar, 2018). Although it is possible that language demands explained these differences, we find this unlikely because children’s future-oriented decision making did not differ and this task placed the highest linguistic demands on participants.

Second, a primary question concerns the longer-term benefits of these adult–child conversations on prospection. Admittedly, we designed the study to carefully manipulate the constructs of future-oriented language and self-projection during an extremely brief interaction—less than 10 min with an experimenter. As such, we did not measure long-term improvements in prospection. However, it is encouraging that these results emerged after such a brief exposure. Thus, an important next step would be to understand how prolonged participation in these conversations might confer the same or greater benefits. Previous research suggests that these types of conversations with preschool children are infrequent (Hudson, 2002, 2006); thus, a question for future research is whether parents or teachers could be trained to engage children in extended self conversations more frequently and, if so, how to best structure those experiences to help children talk and think about their future selves. Our results suggest that future-oriented language can be embedded in routines that are common for preschool-aged children, namely book reading. Thus, future work may consider what other everyday routines may be appropriate for discussing the future such as car rides, mealtimes, and circle time in the classroom.

In sum, it is known that prospection develops rapidly during the early childhood years, yet the mechanisms that support its development have remained underspecified. Here we present evidence that adult–child conversation that increases the vividness of children’s future selves is one such promising mechanism.

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Appendix A. Supplementary material

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jecp.2018.12.008.

References


